Appropriateness of Routine Postoperative Chest Radiography After Tracheotomy

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**Objective:** To determine the appropriateness of postoperative chest radiography after adult tracheotomy.

**Design:** Retrospective case series.

**Setting:** Tertiary care academic medical center.

**Patients:** The records of 379 consecutive adult patients who underwent tracheotomy by the Otolaryngology–Head and Neck Surgery Service from January 1992 to December 1996 were available for review and met inclusion criteria. All patients underwent postoperative chest radiography.

**Main Outcome Measures:** Frequency of postoperative tracheotomy-associated complications, most significantly pneumothorax.

**Results:** The patients had no pneumothorax on postoperative chest films. Minor complications, which were found in 7.1% of the patients, included small bleeds, wound infection, and subcutaneous emphysema. Tracheostomy-associated death occurred in 2 patients (0.5%).

**Conclusions:** Routine postoperative chest radiography is unnecessary after adult tracheotomy. Chest radiography may be indicated by clinically suspicious signs or symptoms.


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**RESULTS**

TRACHEOTOMY is a common procedure for long-term airway management. Complication rates range from 6% to 66%, and the incidence of pneumothorax (PTX) occurring after tracheotomy ranges from 0% to 5%.1,5 The most common reported complications include bleeding, infection, dislodged tracheotomy tube, and pneumonia.5 The Otolaryngology–Head and Neck Surgery Service at the University of Maryland Medical Center, Baltimore, has routinely ordered “stat” portable plain chest radiographs (CXR) after every tracheotomy to rule out PTX. In this era of cost containment we reevaluated this practice. To assess the aptness of this test, we performed a retrospective chart review of all cases involving adult patients who underwent a tracheotomy during a 5-year period.

After exclusion criteria, a total of 379 tracheotomies were evaluated. The average age of the female and male patients was 60 and 57 years, respectively (age range, 16-87 years); 55% of the patients were male. There were 373 nonemergent (98%) and 6 emergent (2%) tracheotomies performed. Prolonged intubation and ventilator dependence were the most common diagnoses for elective tracheotomy (n = 229 [67%]) (Table 1). Tracheotomy for head and neck malignancy was performed in 74 patients (22%). Eighty-four percent of the tracheotomies were performed with the patient under general anesthesia. The 6 emergent tracheotomies were performed without anesthesia (Table 2). All patients underwent postoperative CXR, 90% within 2 hours. There were no PTXs noted. Five CXRs revealed pneumomediastinum (not present preoperatively), which remained clinically silent in all 5 cases.

Two patients died on the operative day of causes unrelated to the tracheotomy or anesthesia and were not included in the complication rate. The overall tracheotomy-related complication rate was 7.7%. The most common complica-
MATERIALS AND METHODS

We reviewed all tracheotomies performed by the otolaryngology service at the University of Maryland Medical System from January 1992 to December 1996. Of these, 402 medical records were available and were included in the study. Procedures were performed by otolaryngology residents under attending surgeon supervision. The majority of cases were performed through a vertical skin incision with superior retraction of the thyroid isthmus and formation of an inferiorly based (Bjork) tracheal flap sutured to the skin. All procedures were performed in the operating room except the emergent procedures, which were performed at the bedside. General anesthesia was used unless the surgeon thought that oral or nasal intubation would be unsafe because of anatomic considerations. Exclusion criteria were age younger than 16 years, preoperative PTX or chest tube, or simultaneous procedure that required chest tube insertion.

The following data were reviewed: age, sex, type of procedure (emergent or nonemergent), diagnosis requiring tracheotomy, final CXR report by the attending radiologist, procedure- or anesthesia-related postoperative complications, and discharge disposition (home, rehabilitation facility, or chronic care/nursing home facility).

COMMENT

Tracheotomy is one of the most common procedures performed by the otolaryngology service at our institution. Postoperative CXRs have routinely been ordered to rule out PTX. We decided to retrospectively analyze the efficacy of this practice.

Our complication rate of 7.7% compared well with published rates of 6% to 66%.[2,6,7] Our major procedure-related complications were 2 deaths (0.5%), which compared favorably with the published rate of 1.6%.[3] The most common reported causes of mortality after tracheotomy are tube dislodgment, bleeding, and tube obstruction. Our 2 mortalities were caused by tube dislodgment and tube obstruction.

Published rates of PTX range from 0% to 5%.[4,5,6] Our rate was 0% for 379 procedures. Since the rate is low and significant PTXs present clinical symptoms of respiratory difficulty and hemodynamic instability, CXR should be reserved for those cases in which there is clinical suspicion of a PTX. Other indications may include difficult surgical dissection with suspected pleural penetration and postoperative respiratory compromise.

Five patients (1.3%) developed pneumomediastinum, and 1 patient (0.3%) developed notable subcutaneous air. The reported rates of each are 1%.[3] All the cases
of pneumomediastinum were self-limited, with no intervention required. The subcutaneous air was clinically evident and resolved without therapy.

While the cost of 1 stat portable CXR may be small compared with the total cost of a hospital stay, we estimate that our hospital alone would save more than $77,000 by not ordering routine posttracheotomy CXRs. In 14 pediatric tracheotomies (data not shown), there were no major complications and no PTX. Further study of postoperative CXR in this patient population is warranted.

Although this series is retrospective and includes tracheotomies performed by only 1 service, the results are broadly applicable, because all patients were included regardless of diagnosis, anesthesia, or urgency of procedure. Therefore, we recommend that postoperative CXR be reserved for those cases in which the physician clinically suspects a PTX.

CONCLUSIONS

Our review of 379 consecutive tracheotomies revealed no PTXs, which falls within the reported range of 0% to 5%. We propose that routine postoperative CXR be eliminated and that CXR be reserved for those cases in which there is clinical suspicion of a PTX. In this era of increasing cost containment, we must continually reassess our standard care practices to maximize care and to minimize cost. Therefore, routine CXR after tracheotomy in adults is not indicated.

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REFERENCES